Configuring LNM Services

BayRS Version 13.00
Site Manager Software Version 7.00

Part No. 303534-A Rev 00
October 1998

Bay Networks

Where Information Flows.™

Bay Networks Where Information Flows.

4401 Great America Parkway
Santa Clara, CA 95054

8 Federal Street
Billerica, MA 01821

Copyright © 1998 Bay Networks, Inc.

All rights reserved. Printed in the USA. October 1998.

The information in this document is subject to change without notice. The statements, configurations, technical data, and recommendations in this document are believed to be accurate and reliable, but are presented without express or implied warranty. Users must take full responsibility for their applications of any products specified in this document. The information in this document is proprietary to Bay Networks, Inc.

The software described in this document is furnished under a license agreement and may only be used in accordance with the terms of that license. A summary of the Software License is included in this document.

Trademarks

ACE, AFN, AN, BCN, BLN, BN, BNX, CN, FRE, LN, Optivity, PPX, Quick2Config, and Bay Networks are registered trademarks and Advanced Remote Node, ANH, ARN, ASN, BayRS, BaySecure, BayStack, BayStream, BCC, BCNX, BLNX, EZ Install, EZ Internetwork, EZ LAN, FN, IP AutoLearn, PathMan, RouterMan, SN, SPEX, Switch Node, System 5000, and the Bay Networks logo are trademarks of Bay Networks, Inc.

Microsoft, MS, MS-DOS, Win32, Windows, and Windows NT are registered trademarks of Microsoft Corporation.

All other trademarks and registered trademarks are the property of their respective owners.

Restricted Rights Legend

Use, duplication, or disclosure by the United States Government is subject to restrictions as set forth in subparagraph (c)(1)(ii) of the Rights in Technical Data and Computer Software clause at DFARS 252.227-7013.

Notwithstanding any other license agreement that may pertain to, or accompany the delivery of, this computer software, the rights of the United States Government regarding its use, reproduction, and disclosure are as set forth in the Commercial Computer Software-Restricted Rights clause at FAR 52.227-19.

Statement of Conditions

In the interest of improving internal design, operational function, and/or reliability, Bay Networks, Inc. reserves the right to make changes to the products described in this document without notice.

Bay Networks, Inc. does not assume any liability that may occur due to the use or application of the product(s) or circuit layout(s) described herein.

Portions of the code in this software product may be Copyright © 1988, Regents of the University of California. All rights reserved. Redistribution and use in source and binary forms of such portions are permitted, provided that the above copyright notice and this paragraph are duplicated in all such forms and that any documentation, advertising materials, and other materials related to such distribution and use acknowledge that such portions of the software were developed by the University of California, Berkeley. The name of the University may not be used to endorse or promote products derived from such portions of the software without specific prior written permission.

SUCH PORTIONS OF THE SOFTWARE ARE PROVIDED “AS IS” AND WITHOUT ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, WITHOUT LIMITATION, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

In addition, the program and information contained herein are licensed only pursuant to a license agreement that contains restrictions on use and disclosure (that may incorporate by reference certain limitations and notices imposed by third parties).

Bay Networks, Inc. Software License Agreement

NOTICE: Please carefully read this license agreement before copying or using the accompanying software or installing the hardware unit with pre-enabled software (each of which is referred to as "Software" in this Agreement). BY COPYING OR USING THE SOFTWARE, YOU ACCEPT ALL OF THE TERMS AND CONDITIONS OF THIS LICENSE AGREEMENT. THE TERMS EXPRESSED IN THIS AGREEMENT ARE THE ONLY TERMS UNDER WHICH BAY NETWORKS WILL PERMIT YOU TO USE THE SOFTWARE. If you do not accept these terms and conditions, return the product, unused and in the original shipping container, within 30 days of purchase to obtain a credit for the full purchase price.

1. License Grant. Bay Networks, Inc. ("Bay Networks") grants the end user of the Software ("Licensee") a personal, nonexclusive, nontransferable license: a) to use the Software either on a single computer or, if applicable, on a single authorized device identified by host ID, for which it was originally acquired; b) to copy the Software solely for backup purposes in support of authorized use of the Software; and c) to use and copy the associated user manual solely in support of authorized use of the Software by Licensee. This license applies to the Software only and does not extend to Bay Networks Agent software or other Bay Networks software products. Bay Networks Agent software or other Bay Networks software products are licensed for use under the terms of the applicable Bay Networks, Inc. Software License Agreement that accompanies such software and upon payment by the end user of the applicable license fees for such software.

2. Restrictions on use; reservation of rights. The Software and user manuals are protected under copyright laws. Bay Networks and/or its licensors retain all title and ownership in both the Software and user manuals, including any revisions made by Bay Networks or its licensors. The copyright notice must be reproduced and included with any copy of any portion of the Software or user manuals. Licensee may not modify, translate, decompile, disassemble, use for any competitive analysis, reverse engineer, distribute, or create derivative works from the Software or user manuals or any copy, in whole or in part. Except as expressly provided in this Agreement, Licensee may not copy or transfer the Software or user manuals, in whole or in part. The Software and user manuals embody Bay Networks' and its licensors' confidential and proprietary intellectual property. Licensee shall not sublicense, assign, or otherwise disclose to any third party the Software, or any information about the operation, design, performance, or implementation of the Software and user manuals that is confidential to Bay Networks and its licensors; however, Licensee may grant permission to its consultants, subcontractors, and agents to use the Software at Licensee's facility, provided they have agreed to use the Software only in accordance with the terms of this license.

3. Limited warranty. Bay Networks warrants each item of Software, as delivered by Bay Networks and properly installed and operated on Bay Networks hardware or other equipment it is originally licensed for, to function substantially as described in its accompanying user manual during its warranty period, which begins on the date Software is first shipped to Licensee. If any item of Software fails to so function during its warranty period, as the sole remedy Bay Networks will at its discretion provide a suitable fix, patch, or workaround for the problem that may be included in a future Software release. Bay Networks further warrants to Licensee that the media on which the Software is provided will be free from defects in materials and workmanship under normal use for a period of 90 days from the date Software is first shipped to Licensee. Bay Networks will replace defective media at no charge if it is returned to Bay Networks during the warranty period along with proof of the date of shipment. This warranty does not apply if the media has been damaged as a result of accident, misuse, or abuse. The Licensee assumes all responsibility for selection of the Software to achieve Licensee's intended results and for the installation, use, and results obtained from the Software. Bay Networks does not warrant a) that the functions contained in the software will meet the Licensee's requirements, b) that the Software will operate in the hardware or software combinations that the Licensee may select, c) that the operation of the Software will be uninterrupted or error free, or d) that all defects in the operation of the Software will be corrected. Bay Networks is not obligated to remedy any Software defect that cannot be reproduced with the latest Software release. These warranties do not apply to the Software if it has been (i) altered, except by Bay Networks or in accordance with its instructions; (ii) used in conjunction with another vendor's product, resulting in the defect; or (iii) damaged by improper environment, abuse, misuse, accident, or negligence. THE FOREGOING WARRANTIES AND LIMITATIONS ARE EXCLUSIVE REMEDIES AND ARE IN LIEU OF ALL OTHER WARRANTIES EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Licensee is responsible for the security of

its own data and information and for maintaining adequate procedures apart from the Software to reconstruct lost or altered files, data, or programs.

4. Limitation of liability. IN NO EVENT WILL BAY NETWORKS OR ITS LICENSORS BE LIABLE FOR ANY COST OF SUBSTITUTE PROCUREMENT; SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES; OR ANY DAMAGES RESULTING FROM INACCURATE OR LOST DATA OR LOSS OF USE OR PROFITS ARISING OUT OF OR IN CONNECTION WITH THE PERFORMANCE OF THE SOFTWARE, EVEN IF BAY NETWORKS HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. IN NO EVENT SHALL THE LIABILITY OF BAY NETWORKS RELATING TO THE SOFTWARE OR THIS AGREEMENT EXCEED THE PRICE PAID TO BAY NETWORKS FOR THE SOFTWARE LICENSE.

5. Government Licensees. This provision applies to all Software and documentation acquired directly or indirectly by or on behalf of the United States Government. The Software and documentation are commercial products, licensed on the open market at market prices, and were developed entirely at private expense and without the use of any U.S. Government funds. The license to the U.S. Government is granted only with restricted rights, and use, duplication, or disclosure by the U.S. Government is subject to the restrictions set forth in subparagraph (c)(1) of the Commercial Computer Software—Restricted Rights clause of FAR 52.227-19 and the limitations set out in this license for civilian agencies, and subparagraph (c)(1)(ii) of the Rights in Technical Data and Computer Software clause of DFARS 252.227-7013, for agencies of the Department of Defense or their successors, whichever is applicable.

6. Use of Software in the European Community. This provision applies to all Software acquired for use within the European Community. If Licensee uses the Software within a country in the European Community, the Software Directive enacted by the Council of European Communities Directive dated 14 May, 1991, will apply to the examination of the Software to facilitate interoperability. Licensee agrees to notify Bay Networks of any such intended examination of the Software and may procure support and assistance from Bay Networks.

7. Term and termination. This license is effective until terminated; however, all of the restrictions with respect to Bay Networks' copyright in the Software and user manuals will cease being effective at the date of expiration of the Bay Networks copyright; those restrictions relating to use and disclosure of Bay Networks' confidential information shall continue in effect. Licensee may terminate this license at any time. The license will automatically terminate if Licensee fails to comply with any of the terms and conditions of the license. Upon termination for any reason, Licensee will immediately destroy or return to Bay Networks the Software, user manuals, and all copies. Bay Networks is not liable to Licensee for damages in any form solely by reason of the termination of this license.

8. Export and Re-export. Licensee agrees not to export, directly or indirectly, the Software or related technical data or information without first obtaining any required export licenses or other governmental approvals. Without limiting the foregoing, Licensee, on behalf of itself and its subsidiaries and affiliates, agrees that it will not, without first obtaining all export licenses and approvals required by the U.S. Government: (i) export, re-export, transfer, or divert any such Software or technical data, or any direct product thereof, to any country to which such exports or re-exports are restricted or embargoed under United States export control laws and regulations, or to any national or resident of such restricted or embargoed countries; or (ii) provide the Software or related technical data or information to any military end user or for any military end use, including the design, development, or production of any chemical, nuclear, or biological weapons.

9. General. If any provision of this Agreement is held to be invalid or unenforceable by a court of competent jurisdiction, the remainder of the provisions of this Agreement shall remain in full force and effect. This Agreement will be governed by the laws of the state of California.

Should you have any questions concerning this Agreement, contact Bay Networks, Inc., 4401 Great America Parkway, P.O. Box 58185, Santa Clara, California 95054-8185.

LICENSEE ACKNOWLEDGES THAT LICENSEE HAS READ THIS AGREEMENT, UNDERSTANDS IT, AND AGREES TO BE BOUND BY ITS TERMS AND CONDITIONS. LICENSEE FURTHER AGREES THAT THIS AGREEMENT IS THE ENTIRE AND EXCLUSIVE AGREEMENT BETWEEN BAY NETWORKS AND LICENSEE, WHICH SUPERSEDES ALL PRIOR ORAL AND WRITTEN AGREEMENTS AND COMMUNICATIONS BETWEEN THE PARTIES PERTAINING TO THE SUBJECT MATTER OF THIS AGREEMENT. NO DIFFERENT OR ADDITIONAL TERMS WILL BE ENFORCEABLE AGAINST BAY NETWORKS UNLESS BAY NETWORKS GIVES ITS EXPRESS WRITTEN CONSENT, INCLUDING AN EXPRESS WAIVER OF THE TERMS OF THIS AGREEMENT.

Contents

Preface

Before You Begin xiii
Text Conventions xiv
Acronyms xv
Bay Networks Technical Publications xvi
How to Get Help xvii

Chapter 1
LNM Servers Overview

IBM LAN Network Manager 1-1
Local Services 1-3
Network-Wide Services 1-3
LAN Management Servers 1-3
LAN Reporting Mechanism (LRM) 1-6
Reporting Link Maintenance Function 1-6
Control Function 1-7
Routing Function 1-8
Notification Function 1-8
Security Function 1-9
Protocol Boundary Function 1-9
LLC Requirements 1-9
Ring Error Monitor (REM) 1-11
Hard-Error Processing Function 1-11
Soft-Error Processing Function 1-11
Ring Parameter Server (RPS) 1-14
Status Request Function 1-14
Ring Station Parameters Maintenance Function 1-14
Registration Function 1-14
RPS Activation Function 1-15

Configuration Report Server (CRS) 1-15
Station Status Request Function 1-15
Set Station Parameters Function 1-16
Remove Station Function 1-16
Notification Function 1-16
Communication Function 1-16
LAN Bridge Server (LBS) 1-16
Status Request Function 1-17
Set Parameters Function 1-17
Notification Function 1-17
Bridge Performance Monitoring Function 1-17
For More Information About the LAN Management Servers 1-18

Chapter 2
LNM Servers Implementation Notes

Initial Configuration 2-1
Site Manager 2-1
IBM LAN Network Manager 2-2
Internal MAC Address 2-4
External MAC Address 2-4
Using IBM LAN Net Manager to Set LNM Parameters 2-5
Number of RPS Servers per Ring 2-6
Redundant Servers on a Ring 2-6
Passwords 2-6

Chapter 3
Enabling LNM Servers

Enabling LNM Servers on an Interface 3-1

Chapter 4
Editing LNM Servers Parameters

Accessing LNM Servers Parameters 4-2
Editing LNM Servers Global Parameters 4-3
Editing LNM Servers Interface Parameters 4-5
Deleting LNM Servers from a Circuit 4-12
Deleting LNM Servers from the Bay Networks Node 4-12

Appendix A
Site Manager Default Settings

Index

Figures

Figure 1-1. LNM Servers 1-5
Figure 1-2. Controlling and Observing LAN Network Managers 1-8
Figure 1-3. Reporting Links via Multiplexed LLC2 Sessions 1-10
Figure 2-1. Source Routing, LNM, and Line Parameters 2-3
Figure 4-1. Configuration Manager Window 4-2
Figure 4-2. Edit LNM Global Parameters Window 4-3
Figure 4-3. LNM Interface Configuration Window 4-5
Figure 4-4. LNM Interface Configuration Window (Scrolled) 4-6

Tables

Table 1-1. MAC Sublayer Servers and Their Functional Addresses 1-4
Table A-1. LNM Global Parameters A-1
Table A-2. LNM Servers Interface Parameters A-1

Preface

This guide describes LNM services and what you do to start and customize LNM services on a Bay Networks® router.

Before You Begin

Before using this guide, you must complete the following procedures. For a new router:

- Install the router (refer to the installation manual that came with your router).
- Connect the router to the network and create a pilot configuration file (refer to *Quick-Starting Routers*, *Configuring BayStack Remote Access*, or *Connecting ASN Routers to a Network)*.

Make sure that you are running the latest version of Bay Networks BayRS™ and Site Manager software. For information about upgrading BayRS and Site Manager, see the upgrading guide for your version of BayRS.

Text Conventions

This guide uses the following text conventions:

angle brackets (< >)	Indicate that you choose the text to enter based on the description inside the brackets. Do not type the brackets when entering the command. Example: If the command syntax is: **ping** *<ip_address>*, you enter: **ping 192.32.10.12**
bold text	Indicates text that you need to enter and command names and options. Example: Enter **show ip** {**alerts** | **routes**} Example: Use the **dinfo** command.
braces ({})	Indicate required elements in syntax descriptions where there is more than one option. You must choose only one of the options. Do not type the braces when entering the command. Example: If the command syntax is: **show ip** {**alerts** | **routes**}, you must enter either: **show ip alerts** or **show ip routes**.
brackets ([ ])	Indicate optional elements in syntax descriptions. Do not type the brackets when entering the command. Example: If the command syntax is: **show ip interfaces** [**-alerts**], you can enter either: **show ip interfaces** or **show ip interfaces -alerts**.
ellipsis points (. . .)	Indicate that you repeat the last element of the command as needed. Example: If the command syntax is: **ethernet/2/1** [<*parameter*> <*value*>] . . ., you enter **ethernet/2/1** and as many parameter-value pairs as needed.

italic text	Indicates file and directory names, new terms, book titles, and variables in command syntax descriptions. Where a variable is two or more words, the words are connected by an underscore. Example: If the command syntax is: **show at** <*valid_route*> *valid_route* is one variable and you substitute one value for it.
`screen text`	Indicates system output, for example, prompts and system messages. Example: `Set Bay Networks Trap Monitor Filters`
separator (>)	Shows menu paths. Example: Protocols > IP identifies the IP option on the Protocols menu.
vertical line (|)	Separates choices for command keywords and arguments. Enter only one of the choices. Do not type the vertical line when entering the command. Example: If the command syntax is: **show ip** {**alerts** | **routes**}, you enter either: **show ip alerts** or **show ip routes**, but not both.

Acronyms

ASCII	American Standard Code for Information Interchange
CRS	Configuration Report Server
LAN	local area network
LBS	LAN Bridge Server
LLC	Logical Link Control
LNM	LAN Network Manager
LRM	LAN Reporting Mechanism
MAC	media access control

MIB	management information base
REM	Ring Error Monitor
RPS	Ring Parameter Server
WAN	wide area network

Bay Networks Technical Publications

You can now print Bay Networks technical manuals and release notes free, directly from the Internet. Go to *support.baynetworks.com/library/tpubs/*. Find the Bay Networks product for which you need documentation. Then locate the specific category and model or version for your hardware or software product. Using Adobe Acrobat Reader, you can open the manuals and release notes, search for the sections you need, and print them on most standard printers. You can download Acrobat Reader free from the Adobe Systems Web site, *www.adobe.com*.

You can purchase Bay Networks documentation sets, CDs, and selected technical publications through the Bay Networks Collateral Catalog. The catalog is located on the World Wide Web at *support.baynetworks.com/catalog.html* and is divided into sections arranged alphabetically:

- The “CD ROMs” section lists available CDs.
- The “Guides/Books” section lists books on technical topics.
- The “Technical Manuals” section lists available printed documentation sets.

Make a note of the part numbers and prices of the items that you want to order. Use the “Marketing Collateral Catalog description” link to place an order and to print the order form.

How to Get Help

For product assistance, support contracts, or information about educational services, go to the following URL:

http://www.baynetworks.com/corporate/contacts/

Or telephone the Bay Networks Technical Solutions Center at:

800-2LANWAN

Chapter 1
LNM Servers Overview

LNM Services are embodied in the LNM Servers program, the Bay Networks implementation of the five LAN management servers described in the *IBM Token Ring Architecture Reference*. The LNM Servers provide a means for an IBM LAN Network Manager application to monitor and control stations attached to a locally attached token ring LAN.

Note: Bay Networks system software does not support the use of IBM LAN Network Manager to manage or monitor 802.3/Ethernet LAN segments or adapters through a source routing-translating bridge.

This chapter provides

- A brief overview of the IBM LAN Network Manager (LNM) application program
- An overview of the Bay Networks LNM Servers
- A list of additional technical resources

IBM LAN Network Manager

IBM LAN Network Manager is a PC application that allows a network administrator to manage multisegment 802.5/token ring networks. The administrator of a building or campus network can use IBM LAN Network Manager to monitor a single LAN or a group of LANs.

IBM LAN Network Manager can also communicate with the IBM NetView host-based network management product. This enables a NetView administrator to gain access to certain operating capabilities of the IBM LAN Network Manager application.

IBM LAN Network Manager provides facilities for managing the media and adapters within a LAN, and for managing source routing bridges that interconnect LAN segments.

When using an IBM LAN Network Manager workstation, a network administrator can

- Display alerts and recommended actions
- Generate event log reports
- Query, remove, or monitor adapters within the network
- Establish a communications link with an IBM bridge for the purposes of LAN management
- Query and configure IBM bridges
- Monitor token ring network status and errors
- Perform token ring path tests and LAN segment tests

When accessing IBM LAN Network Manager via IBM NetView, a network administrator can

- Display IBM LAN Network Manager alerts and recommended actions
- Generate IBM LAN Network Manager event log reports
- Issue commands to IBM LAN Network Manager

Within a token ring LAN environment, IBM LAN Network Manager can access two different levels of management:

- Local services
- Network-wide services

These services are provided by LNM Servers; see “LNM Management Servers,” later in this chapter, for a discussion of servers.

Local Services

Local services provided by LNM Servers enable you to control each station attached to a token ring segment.

Some examples of local services provided by LNM Servers are

- Initializing new stations with the same parameters used to initialize all other stations attached to the same ring
- Noting the address of the Next Active Upstream Neighbor for each station on a ring
- Collecting error detection messages placed on a specified ring by stations already attached to the same ring

Network-Wide Services

Network-wide services provided by LNM Servers enable you to configure and monitor, from a central site, the operation of each segment of a token ring LAN.

Some examples of network-wide services are

- Requesting statistics or configuration information from LNM Servers
- Removing a ring station from a designated ring
- Collecting error information about the operation of a designated ring
- Permitting manual intervention where necessary to resolve certain operational problems existing on a designated ring

LAN Management Servers

The *IBM Token Ring Architecture Reference* defines five servers that provide local, network-wide, or both types of services to the IBM LAN Network Manager application.

The servers are

- LAN Reporting Mechanism (LRM)
- Ring Error Monitor (REM)
- Ring Parameter Server (RPS)
- Configuration Report Server (CRS)
- LAN Bridge Server (LBS)

REM, RPS, and CRS are MAC sublayer servers, and each has its own *functional address* on the physical LAN it helps to observe or control (Table 1-1).

Table 1-1. MAC Sublayer Servers and Their Functional Addresses

MAC Sublayer Server	Functional Address
REM	C00000000008
RPS	C00000000002
CRS	C00000000002

LRM and LBS are not MAC sublayer servers, and hence have no MAC functional address. LRM and LBS are addressed by means of LLC2 sessions and a protocol internal to the LNM Servers interface.

Ring stations send frames onto the ring to report various conditions. These are MAC frames, and are sent to a particular functional address. The functional addresses of the management servers REM, RPS, and CRS are reserved by IBM for this purpose. For more information about functional addresses, refer to the *IBM Token Ring Network Architecture Reference.*

Figure 1-1 shows the five servers as LLC and MAC sublayer components configured on a token ring circuit. The servers are configured on the same circuit as the source routing bridge interface for the locally attached ring.

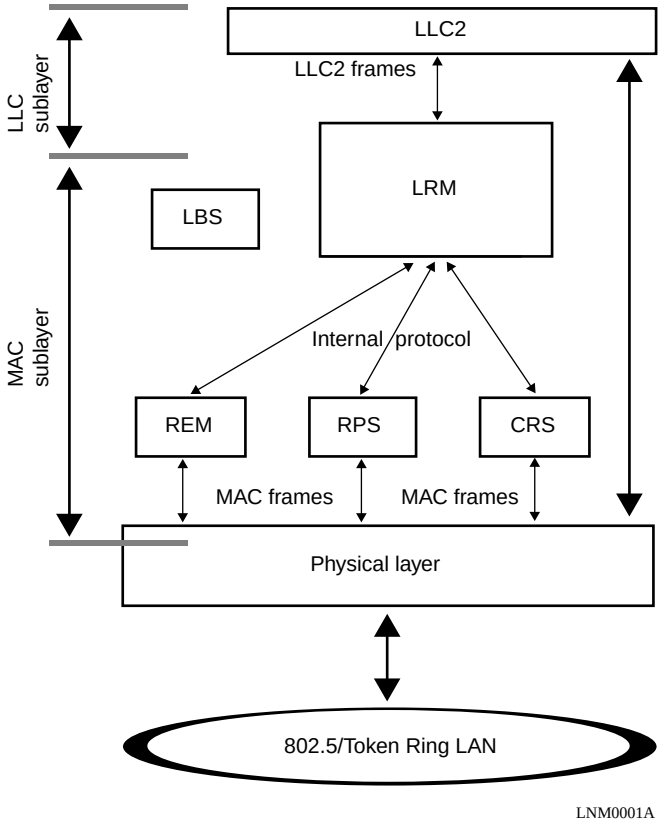


Figure 1-1. LNM Servers

The following sections provide an overview of the five management servers.

LAN Reporting Mechanism (LRM)

The Bay Networks implementation of LRM is one of five LAN management servers you configure on a token ring circuit. LRM supplies network-wide services to the IBM LAN Network Manager application. (The services do not extend beyond the topology of the local token ring.) To supply these services, LRM manages all communications between the IBM LAN Network Manager application and the other management servers.

LRM supports the following major functions:

- Reporting Link Maintenance Function
- Control Function
- Routing Function
- Notification Function
- Security Function
- Protocol Boundary Function

Reporting Link Maintenance Function

The LRM Reporting Link Maintenance Function maintains a separate LLC2 connection (called a *reporting link*) to each IBM LAN Network Manager workstation. Other management servers (REM, RPS, CRS, and LBS) use the reporting links managed by LRM to communicate with the IBM LAN Network Manager, rather than having each server manage its own independent links with the IBM LAN Network Manager workstation.

If a Bay Networks router becomes the only station on a token ring segment, the router removes and reinserts itself on the ring. As a result:

- Any reporting link established between a remote IBM LAN Network Manager and the LNM Servers on that segment fails.
- The IBM LAN Network Manager Events Log receives an alert message indicating the failure of the reporting link.

If you want to ensure that the IBM LAN Network Manager maintains a reporting link to the LNM Servers on the local Bay Networks bridge, you can enable autolinking on the IBM LAN Network Manager. It can then reopen the failed reporting link when the Bay Networks LNM Servers interface becomes active on the ring.

You can also set the “Auto-link time interval” in the IBM LAN Network Manager System Parameters to a value that achieves the best balance between the amount of time in which you require access to the Bay Networks LNM Servers on the desired segment and the potential traffic generated by periodic attempts to reestablish the failed reporting link. You can also disable autolinking on an unnecessary reporting link.

Control Function

The LRM Control Function allows the LAN reporting mechanism to define

- One IBM LAN Network Manager as the *controlling* manager
- One or more IBM LAN Network Managers as noncontrolling or *observing* IBM LAN Network Managers

LRM maintains communication between its local management servers and all authorized IBM LAN Network Manager entities. (The LNM Servers include authorization password functionality, described later in this chapter.)

Figure 1-2 shows one LRM server reporting to multiple IBM LAN Network Manager clients, with only one client controlling the functions and actions of the management servers. Figure 1-2 also shows three Observing LAN Network Managers, which are described later in this chapter.

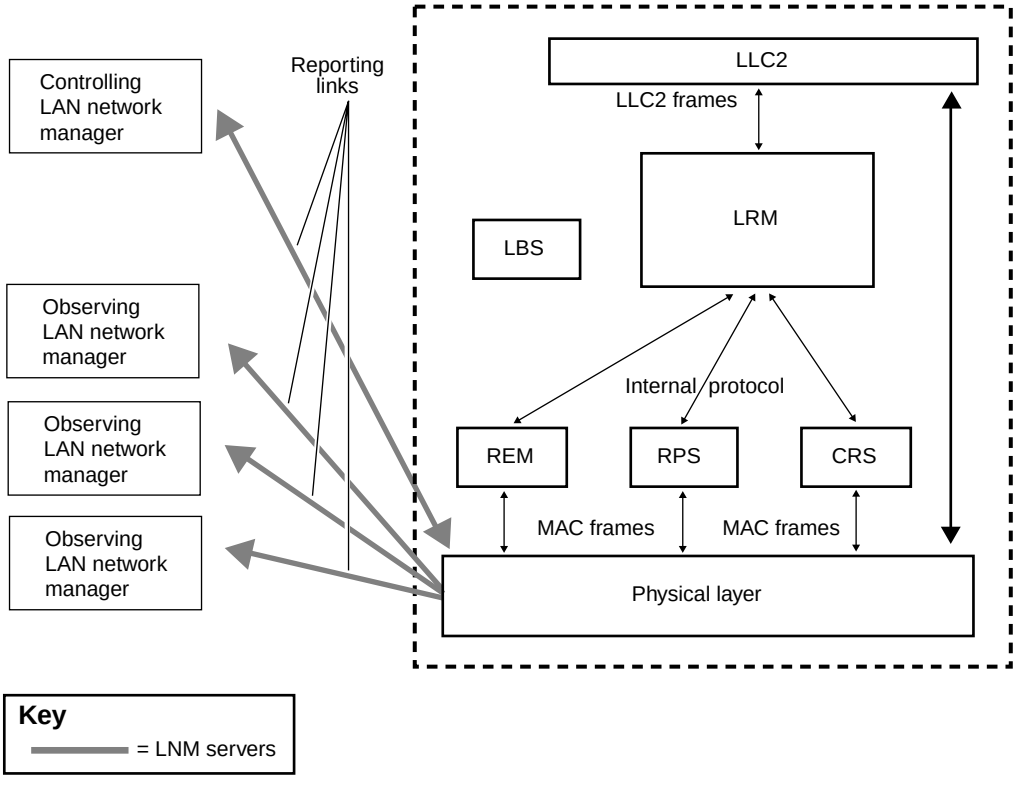


Figure 1-2. Controlling and Observing LAN Network Managers

Routing Function

The LRM Routing Function forwards frames from an IBM LAN Network Manager to the appropriate management server (REM, RPS, CRS, or LBS). The routing function also forwards responses and unsolicited notifications from the management servers to selected remote IBM LAN Network Manager applications.

Notification Function

The LRM Notification Function notifies an IBM LAN Network Manager when requests for new reporting links are accepted or rejected.

Security Function

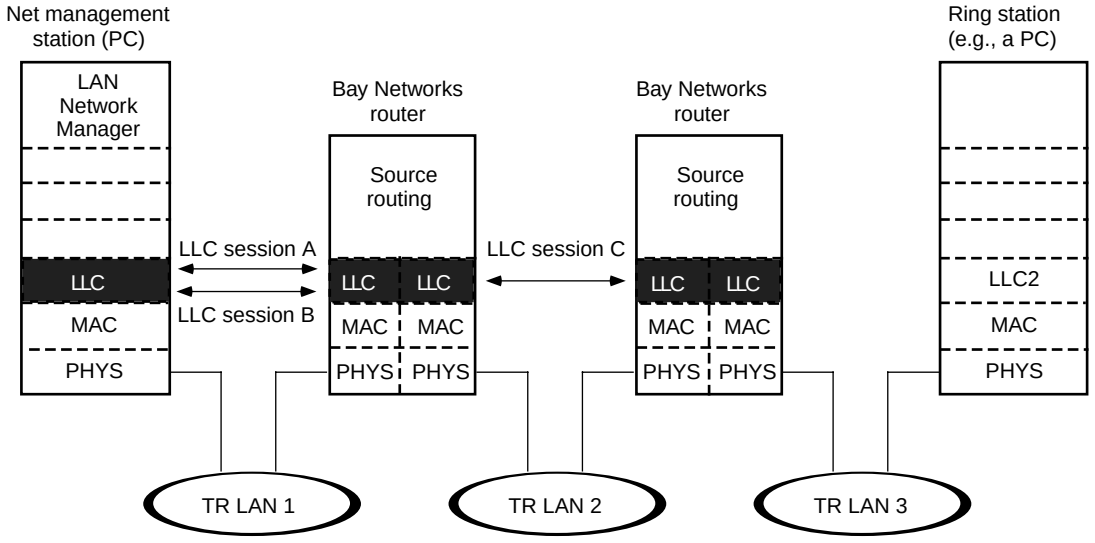
The LRM Security Function maintains and checks ASCII passwords that are used to authenticate users of reporting links.

Protocol Boundary Function

The LRM Protocol Boundary Function allows communication between LRM and its associated management servers. The protocol boundary function also provides a means for management servers to inform LRM about their state (active or inactive).

LLC Requirements

To provide enterprise-wide services for the IBM LAN Network Manager application, LRM requires the presence of an LLC2 sublayer on the same source routing bridge. LLC2 services are necessary to support reporting links to the IBM LAN Network Manager application (Figure 1-3).



Note: LLC session A communicates information about TR LAN 2.
LLC sessions B and C communiate information about TR LAN 3.

Network management station collects information about TR LAN 1, 2, and 3.

LNM0003A

Figure 1-3. Reporting Links via Multiplexed LLC2 Sessions

Note: For more information about LLC support for the LNM Servers, refer to *Configuring LLC Services*.

You initially establish the reporting link through the “Bridge Link” function of the IBM LAN Network Manager application software. (For more information about how to use the Bridge Link function, refer to the *IBM LAN Network Manager User’s Guide*.)

Ring Error Monitor (REM)

The Bay Networks implementation of REM is one of five LAN management servers you configure on a token ring circuit. REM observes, collects, and analyzes hard-error and soft-error reports sent by ring stations on a single ring, and assists in fault isolation and correction. The REM functional address on the ring is the destination address for all soft-error reports generated by ring stations. Hard-error reports are sent to the all-stations MAC address and examined by the REM hard-error analysis program.

REM supports the following functions:

- Hard-Error Processing Function
- Soft-Error Processing Function

Hard-Error Processing Function

The REM Hard-Error Processing Function detects and reports hard errors. Hard errors are permanent or temporary faults, usually in equipment attached to a ring. Permanent hard errors cannot be corrected by software; temporary hard errors can be corrected by software.

Hard errors typically cause a ring to cease operating. A ring station downstream from the faulty station recognizes a hard error, and transmits Beacon MAC frames at specified intervals, until the faulty station removes itself from the affected ring.

Soft-Error Processing Function

The REM Soft-Error Processing Function determines whether a nonrandom or excessive soft-error condition is occurring on the ring to which REM is attached. If possible, REM isolates the most probable source of the soft errors to a single fault domain, where fault domain consists of a ring station, its Next Active Upstream Neighbor, and the media between them.

The REM Soft-Error Processing Function includes the following additional functions:

- Soft-Error Reporting Function
- Nonisolating Soft-Error Processing Function
- Isolating Soft-Error Processing Function
- Intensive Mode Reporting Function

- Receiver-Congestion Error Reporting Function
- Status Request Function
- Set Parameters Function

Soft-Error Reporting Function

REM performs error detection and isolation by analyzing soft-error MAC frames that are periodically sent by ring stations experiencing errors. These MAC frames are sent to the functional address assigned to REM. REM analyzes the soft-error frames as they arrive and determines whether soft errors are occurring at a rate that potentially or currently degrades the performance of the ring. When REM detects such a condition, it notifies the IBM LAN Network Manager and, when possible, provides data indicating the probable source of the error.

The error counters included in a soft-error MAC frame sent by a station are divided into two types: *isolating* and *nonisolating*, which correspond to the type of error being reported. The source of an isolating error can be isolated to a fault domain; the source of a nonisolating error cannot be isolated to a domain smaller than the ring.

Nonisolating Soft-Error Processing Function

Nonisolating errors can be isolated only to the ring on which they occur. A counter is kept for each type of nonisolating error that is reported to REM in soft-error MAC frames. Some internal error counters are also treated as nonisolating errors. If one of these counters exceeds a threshold value, a notification is sent (through LRM) to the IBM LAN Network Manager application, and the REM soft-error counter is reset. No other analysis is performed by REM for nonisolating errors.

Isolating Soft-Error Processing Function

When REM receives a soft-error MAC frame, the accumulated isolating error count is interpreted as a weight. The weight associated with a particular station indicates the likelihood that station is causing excessive soft errors on the local ring. REM stores information about stations having nonzero weights in a table.

REM watches for an *excessive-soft-error threshold* in the table. Exceeding the threshold indicates that

- A problem exists on the local ring

- Ring performance is eroding as a result of this problem

Exceeding the threshold causes REM to notify the IBM LAN Network Manager of the error/ring-performance condition. The notification appears as a Weight Threshold event that you can view and interpret with the Bay Networks Events Manager tool.

After you determine the typical (noncritical or tolerable) error characteristics of the local ring, you can set a value for the Error Rate Threshold, which is an LNM interface parameter. The threshold you set provides for adequate warning of legitimate (performance-degrading) problems on the locally attached ring. (Until you make this determination, you can use the default Error Rate Threshold setting provided by the Bay Networks LNM Servers software.)

For information about how to access and edit the Error Rate Threshold parameter, refer to Chapter 4.

Intensive Mode Reporting Function

The REM Intensive Mode Reporting Function is a facility that enables an IBM LAN Network Manager to request a Ring Error Monitor to forward selected soft-error MAC frames. The requesting IBM LAN Network Manager receives the requested frames.

Receiver-Congestion Error Reporting Function

The REM Receiver-Congestion Error Reporting Function identifies stations that cannot receive a significant number of frames from the ring because their input buffers are full.

Status Request Function

The REM Status Request Function accepts and responds to requests for status from IBM LAN Network Manager.

Set Parameters Function

The REM Set Parameters Function accepts and executes requests from the controlling IBM LAN Network Manager to set REM parameters.

Ring Parameter Server (RPS)

The Bay Networks implementation of RPS is one of five LAN management servers you configure on a token ring circuit. RPS provides the following main services:

- Sends initialization information to new stations that are attaching to the ring
- Ensures that stations on the ring have consistent values for operating parameters
- Forwards registration information from stations attaching to the ring to the IBM LAN Network Manager application

RPS also supports the following functions:

- Status Request Function
- Ring Station Parameters Maintenance Function
- Registration Function
- RPS Activation Function

Status Request Function

The RPS Status Request Function accepts and executes requests for status from the IBM LAN Network Manager application.

Ring Station Parameters Maintenance Function

The RPS Ring Station Parameters Maintenance Function issues commands to set parameter values in ring stations. The ring station operational parameters controlled by RPS are

- Ring number
- Soft-error report timer

Registration Function

The RPS Registration Function accepts unsolicited registration information from ring stations and forwards this information to the IBM LAN Network Manager application through LRM. RPS also responds to the station's request for registration by sending the current values for the ring's operational parameters to the requesting station.

RPS Activation Function

When a Ring Parameter Server becomes active on a ring, it determines if another RPS is already active on the ring. If another RPS is not active on the same ring, the RPS in the attaching station activates its Ring Station Parameters Maintenance Function. It then broadcasts an Initialize Ring Station MAC frame a predetermined number of times to all stations on the same ring. This mechanism facilitates the establishment of default ring operational parameters.

If another RPS is already active on the same ring, the new RPS compares the values received for the ring's operational parameters with its own stored values. If the values match, the RPS activates its RPS function. If the values do not match, the new RPS reports that its parameters are inconsistent with the existing parameters for the ring. The RPS then disables its own functional address, to prevent it from receiving requests for initialization from stations attaching to the ring.

Configuration Report Server (CRS)

The Bay Networks implementation of CRS is one of five LAN management servers you configure on a token ring circuit. CRS accepts commands from the IBM LAN Network Manager application to get station information, set station parameters, and remove stations on the locally attached ring. CRS also collects and forwards configuration reports generated by stations on the local ring to the IBM LAN Network Manager application.

CRS supports the following functions:

- Station Status Request Function
- Set Station Parameters Function
- Remove Station Function
- Notification Function
- Communication Function

Station Status Request Function

The CRS Station Status Request Function accepts and executes requests from the IBM LAN Network Manager application to get the status of stations on the CRS ring and returns the results to the IBM LAN Network Manager application through LRM.

Set Station Parameters Function

The CRS Set Station Parameters Function accepts and executes requests from the IBM LAN Network Manager application to set the values of operational parameters in stations on the CRS ring. The success or failure of this operation is reported to the IBM LAN Network Manager application through LRM.

Remove Station Function

The CRS Remove Station Function accepts and executes requests from the IBM LAN Network Manager application to force a station to leave the CRS ring. The success or failure of this operation is reported to the IBM LAN Network Manager application through LRM.

Notification Function

The CRS Notification Function forwards information about configuration changes on the CRS ring to the IBM LAN Network Manager application through LRM. The configuration changes reported are new Active Monitor and new Next Active Upstream Neighbor.

Communication Function

The CRS Communication Function determines the types of frames sent between CRS and the IBM LAN Network Manager application, using the LRM reporting link.

LAN Bridge Server (LBS)

The Bay Networks implementation of LBS is one of five LAN management servers you configure on a token ring circuit. LBS keeps statistical information about frames forwarded between two rings (through a source routing bridge) and sends this information to selected IBM LAN Network Managers (through LRM).

LBS supports the following functions:

- Status Request Function
- Set Parameters Function
- Notification Function
- Bridge Performance Monitoring Function

Status Request Function

The LBS Status Request Function accepts and responds to requests for status from the IBM LAN Network Manager application.

Set Parameters Function

The LBS Set Parameters Function accepts and executes commands from a controlling IBM LAN Network Manager. The commands change the operational parameters of LBS.

Notification Function

The LBS Notification Function collects inter-ring traffic statistics and forwards this information to the IBM LAN Network Manager application. This function also notifies IBM LAN Network Manager of LBS state changes.

Bridge Performance Monitoring Function

The LBS Bridge Performance Monitoring Function maintains counters for

- The number of frames and bytes forwarded through the bridge
- The number of frames not received by a bridge station because the station was congested

Periodically the percentage of frames lost or discarded by the bridge because of anomalies is calculated and, if the percentage exceeds a predefined threshold, LBS sends a notification to the IBM LAN Network Manager application.

LBS can also be configured to periodically send its error and traffic counters to the IBM LAN Network Manager application to allow for trend analysis by the application.

For More Information About the LAN Management Servers

The following publications provide technical details about token ring LANs, source routing bridges, the IBM LAN Network Manager application, and the LAN Network Management Servers LRM, REM, RPS, CRS, and LBS:

IBM Corporation, SC303374-2. *IBM Token Ring Network Architecture Reference.* Third Edition. September 1989.

IBM Corporation, 31G6962. *IBM LAN Network Manager User's Guide*. December 1991.

IBM Corporation, SA21-9994-0. *IBM 8209 Local Area Network Bridge*.

IBM Corporation, 31G6960. *IBM Token Ring Network Bridge Program Version 2.2 User's Guide*. Fifth Edition. 1990.

Perlman, Radia. *Interconnections: Bridges and Routers*. Reading, Mass.: Addison-Wesley, 1992.

Chapter 2
LNM Servers Implementation Notes

This chapter provides basic guidelines for configuring and using the Bay Networks LNM Servers, and for using IBM LAN Network Manager versus Site Manager for LNM Server operations.

Initial Configuration

When you configure the LNM Servers on a Bay Networks router, both Site Manager and IBM LAN Network Manager require specific configuration information, as described in this chapter.

Site Manager

When you select the LNM Servers in the Protocols selection window, the Configuration Manager tool automatically selects Source Routing and LLC2. You must supply the following information to Site Manager through the Configuration Manager:

- Source routing global parameters (Internal LAN ID, Bridge ID, Group LAN ID)
- Source routing interface parameters (Ring Number)
- LNM Servers interface parameters (refer to "Internal MAC Address," later in this chapter)
- Line parameters (refer to "External MAC Address," later in this chapter)

For information about configuring source routing bridge global and interface parameters, refer to *Configuring Bridging Services*.

IBM LAN Network Manager

To acquire knowledge of LNM Servers on a Bay Networks router, the IBM LAN Network Manager program requires you to

- Define source routing bridges in your network. (You supply the MAC address on each side of any source routing bridge configured with LAN management servers.)
- Link to source routing bridges in your network. (You use the Bridge Linking function of the IBM LAN Network Manager program.)

Each MAC address must be unique within the associated source routing network. The two MAC addresses you need to supply to IBM LAN Network Manager are called

- Internal MAC Address (associated with the Internal LAN of the router)
- External MAC Address (associated with the token ring circuit you wish to monitor or control by means of IBM LAN Network Manager workstations)

Figure 2-1 shows a Bay Networks router configured with several source routing bridge interfaces, each of which supports a set of LNM Servers. Each set of Servers in turn monitors activity on a locally attached token ring segment. The figure shows the locations logically associated with the Internal and External MAC addresses required by an IBM LAN Network Manager workstation for each LNM-capable bridge on a router. The diagram also shows the locations logically associated with the Internal LAN ID and the external Ring IDs.

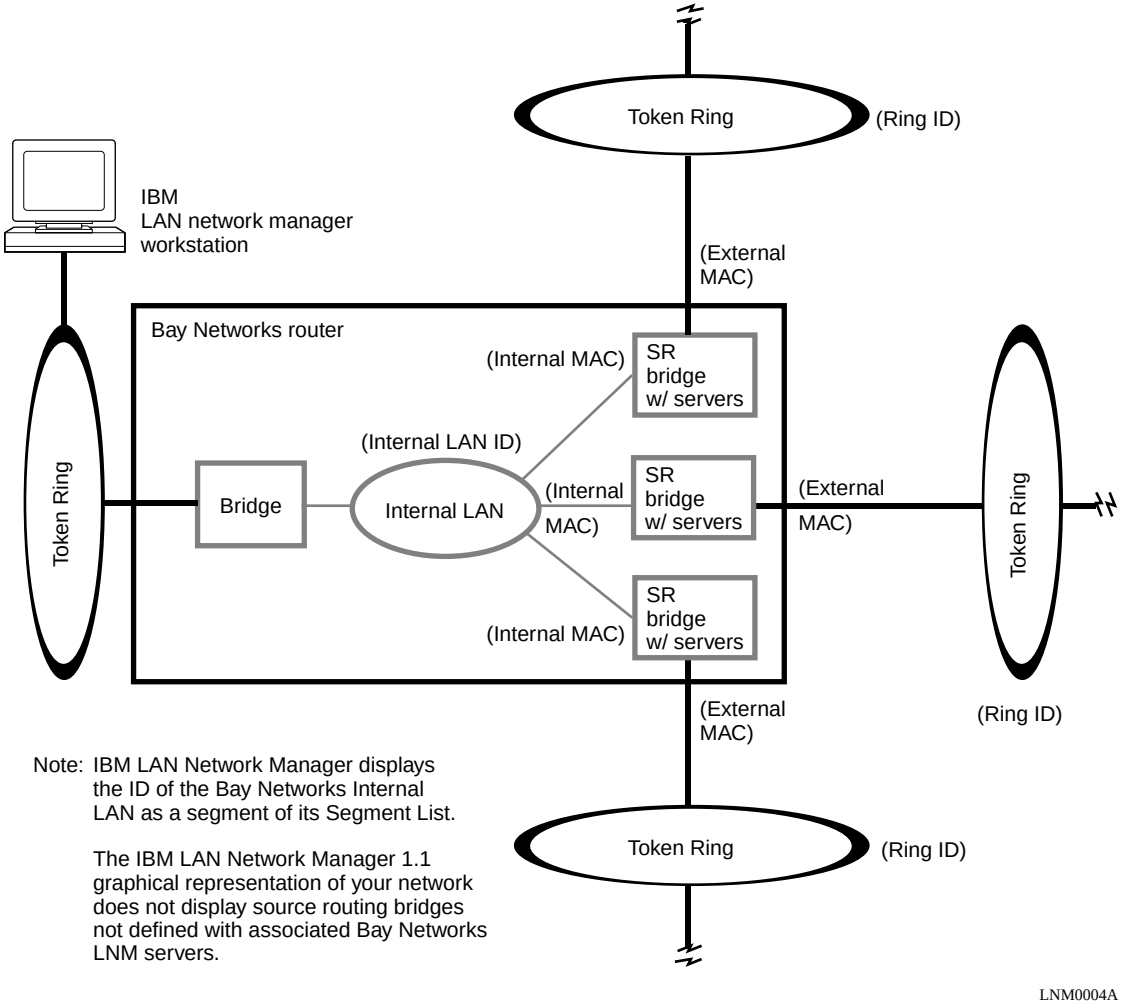


Figure 2-1. Source Routing, LNM, and Line Parameters

Internal MAC Address

Internal MAC Address is an LNM Servers interface-level parameter. You must enter an internal MAC address when you initially add an LNM Servers interface to the router configuration.

The only requirement for the Internal MAC Address parameter is that its value always be unique within the associated source routing network. For information about how to access or edit this parameter, refer to Chapter 4, "Editing LNM Servers Parameters."

External MAC Address

Each circuit on which you need to configure an LNM Servers interface has an associated MAC address on the locally attached token ring segment. You set this address by means of the MAC Address Select parameter of the circuit associated with that segment. You can access the MAC Address Select parameter by means of the following procedure:

1. **Select Circuits > Edit Circuit from the Configuration Manager window. (This invokes the Circuits List window.)**
2. **In the Circuits List window, click on the name of a circuit on which you want to configure an LNM Servers interface.**
3. **Click on Edit in the Circuits List window. (This invokes the Circuit Definition window.)**
4. **From the Circuit Definition window, select Lines > Edit Line to access the MAC Address Select parameter.**

The MAC Address Select parameter allows three options:

- BOXWIDE
- PROM (Default setting)
- CNFG

Caution: Do not use the BOXWIDE option of the MAC Address Select parameter associated with any circuit on which you wish to configure an LNM Servers interface. If you do, the IBM LAN Network Manager application is unable to differentiate between LNM Servers on different circuits of a Bay Networks router.

If you use the PROM-based MAC address option (the default) for a given circuit, you must subsequently use the Quick Get function of the Statistics Manager tool to discover the actual address written into the LNM interface record for that circuit. (For information about how to use the Quick Get tool, refer to *Configuring and Managing Routers with Site Manager.*) After you obtain the address supplied by the PROM associated with that circuit, you can enter the value into the appropriate parameter field of the IBM LAN Network Manager application.

If you choose the CNFG (user-configured) option, you must also enter a unique value into the MAC Address Override parameter field associated with that circuit. As with the PROM-based option, the address you enter into the MAC Address Override parameter field must be unique within the associated source routing network.

Using IBM LAN Net Manager to Set LNM Parameters

Bay Networks router software does not allow the Controlling IBM LAN Network Manager application to set MIB values on a Bay Networks router. The LNM "Set" Privilege global parameter has a default setting of Disable for this reason. Site Manager allows you to change the setting of this parameter to Enable, but you must use only the default Disable setting.

If you attempt to use IBM LAN Network Manager to set the value of a parameter in the MIB, you receive an error message such as the following from LAN Network Manager:

```
Bridge parameters could not be set
for the listed reason (n)
Reporting Link 0-8
DFIPD456E
```

In this example, the Reporting Link number is 0, and the Reason Code is 8, which means that the Bay Networks router rejected the SET operation.

For more information about messages of this type, refer to the *IBM LAN Network Manager User's Guide*.

Number of RPS Servers per Ring

The *IBM Token Ring Network Architectural Reference* specifies that only one RPS server should exist on each token ring segment. You must ensure that among all Bay Networks bridges and other bridges on a given segment, only one RPS server is enabled.

Redundant Servers on a Ring

The IBM LAN Network Manager workstation might have its own set of management servers monitoring the segment locally attached to that workstation. Refer to Figure 2-1. If this is true, then you need not enable the LNM Servers on the Bay Networks source routing bridge interface to the same segment.

Passwords

Bay Networks system software includes ASCII password functionality for the Controlling and Observing IBM LAN Network Manager applications. You can use the password parameters of the LNM Servers Interfaces screen to support password-only access for up to four (authorized) Reporting Links to the LRM Server for a given bridge. (LRM can communicate with the Controlling IBM LAN Network Manager and up to three Observing IBM LAN Network Managers.)

This capability is defined as a Security Function in the *IBM Token Ring Network Architectural Reference*. This Security Function maintains and checks passwords that are used to authenticate users of Reporting Links, usually network administrators who are using the IBM LAN Network Manager application.

The designated Controlling and Observing IBM LAN Network Manager applications automatically receive notification when LRM in a given source routing bridge rejects an attempt by an unauthorized IBM LAN Network Manager to establish a Reporting Link to that LRM server.

Chapter 3
Enabling LNM Servers

This chapter describes how to enable LNM Servers. It assumes you have

1. Opened a configuration file.
2. Specified router hardware if this is a local-mode configuration file.
3. Selected the link- or net-module connector on which you are enabling LNM.

Enabling LNM Servers on an Interface

To enable LNM Servers on an interface:

1. **Select LNM from the WAN Protocols menu; this menu appears after you select a link- or net-module connector that requires a WAN circuit.**

   Protocol prioritization is enabled automatically when you select LNM. For detailed information about protocol prioritization, refer to *Configuring Traffic Filters and Protocol Prioritization.*

2. **Click on OK to enable default LNM Servers.**

   The Configuration Manager displays the Select Protocols window. Go to the appropriate protocol-specific guide for information about enabling the protocols you want to run on this interface.

   When you enable LNM Servers, you do not have to configure any LNM parameters. The Configuration Manager supplies default values for all LNM parameters. If you want to edit these default values, refer to Chapter 4.

Chapter 4
Editing LNM Servers Parameters

This chapter describes how you use Site Manager software to

- Access LNM Servers parameters
- Edit LNM Servers global parameters
- Edit LNM Servers interface parameters
- Delete LNM Servers from a circuit
- Delete all LNM Servers from the router

After you successfully enable a set of LNM Servers on the router, you can use Site Manager to edit parameters associated with the servers. Note that you can add only one set of LNM Servers per physical circuit.

This chapter assumes that you have already added one or more source routing bridges and LNM default interfaces to a router configuration file you want to edit. (Refer to *Configuring and Managing Routers with Site Manager* if you need to add LNM Servers to the configuration file.)

When you configure the LNM Servers on a token ring attachment circuit, you supply information required by lower-layer protocols (MAC, LLC, and source routing). These protocols together support local session termination, connection, and source routing services for the LNM Servers on that physical circuit.

For each LNM parameter, this chapter provides information about default settings, valid parameter options, the parameter function, instructions for setting the parameter, and the Management Information Base (MIB) object ID.

The Technician Interface allows you to modify parameters by issuing **set** and **commit** commands with the MIB object ID. This process is equivalent to modifying parameters using Site Manager. For more information about using the Technician Interface to access the MIB, refer to *Using Technician Interface Software*.

Caution: The Technician Interface does not verify that the value you enter for a parameter is valid. Entering an invalid value can corrupt your configuration.

Accessing LNM Servers Parameters

To edit LNM Servers global or interface parameters, you begin from the Configuration Manager window (Figure 4-1). Select Protocols > LNM Servers to display the LNM Servers options submenu.

Figure 4-1. Configuration Manager Window

Editing LNM Servers Global Parameters

To edit the LNM Servers Global parameters, begin at the Configuration Manager window (Figure 4-1) and proceed as follows:

1. **Select Protocols > LNM Servers > Global.**

   The Edit LNM Global Parameters window appears (Figure 4-2).

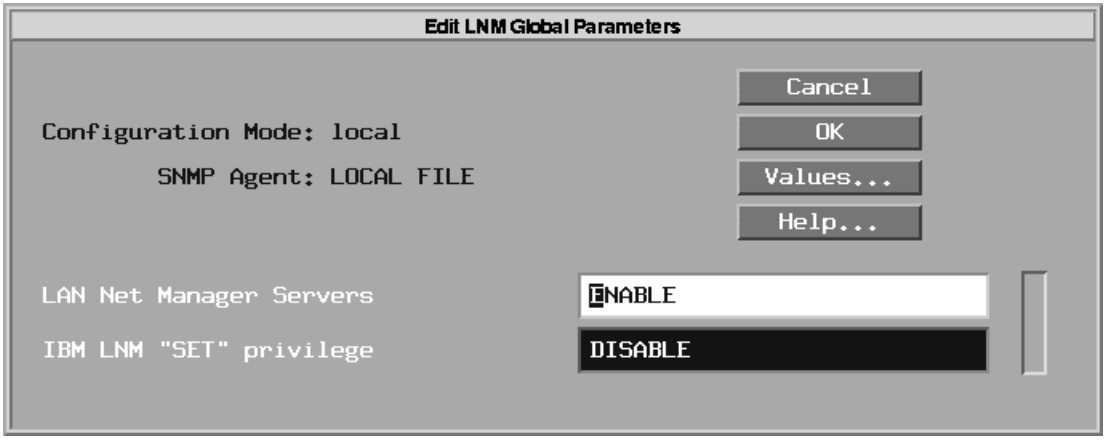


Figure 4-2. Edit LNM Global Parameters Window

2. **Change one or both of the LNM global parameters, as appropriate for your current IBM LAN Network Manager observation or control requirements.**

   Use the descriptions that follow as a guide.

3. **Click on OK to save your changes and exit the window.**

Parameter: **LAN Net Manager Servers**

Default: Enable

Options: Enable | Disable

Function: Globally enables or disables the system software mechanisms that allow users to add LNM Servers to any physical circuit. Other significant actions performed by the system software when you choose a setting are

Disable -- Forces every LNM Server existing on this slot into the “down” (inoperative) state.

Enable -- Reinitializes every LNM Server existing on this node, with each subsystem maintaining the most recent setting of its own Interface Enable/Disable parameter. The actual up/down operating state of each subsystem at the time of global reinitialization further depends on the current operational state of the associated circuit.

Instructions: Select Disable to force every LNM Server existing on this node into the “down” (inoperative) state.

Select Enable only when existing LNM Servers are in the disabled state. You can globally reinitialize all local LNM Servers, with each server maintaining the most recent setting of its own Interface Enable/Disable parameter.

MIB Object ID: 1.3.6.1.4.1.18.3.5.12.1.2

Parameter: **IBM LNM “SET” privilege**

Default: Disable

Options: Enable | Disable

Function: Grants or denies the Controlling IBM LAN Network Manager application the ability to set MIB values that affect the operation of any target LNM Server configured on this node.

Instructions: For Version 7.60 (or later) of the router system software, leave the setting of this parameter to Disable. The Disable setting prevents the Controlling IBM LAN Network Manager application from setting MIB variables for any target LNM Server configured on this router.

MIB Object ID: 1.3.6.1.4.1.18.3.5.12.1.4

Editing LNM Servers Interface Parameters

Any LNM Servers interface you add to a token ring physical circuit inherits from the LNM Servers Global facility a default set of LNM Servers parameter values. You can use the Configuration Manager to access and modify parameters pertaining to the LNM Servers for a specific ring. To do so, begin at the Configuration Manager window (Figure 4-1) and proceed as follows:

1. **Select Protocols > LNM Servers > Interfaces to display the LNM Interface Configuration window (Figures 4-3 and 4-4).**

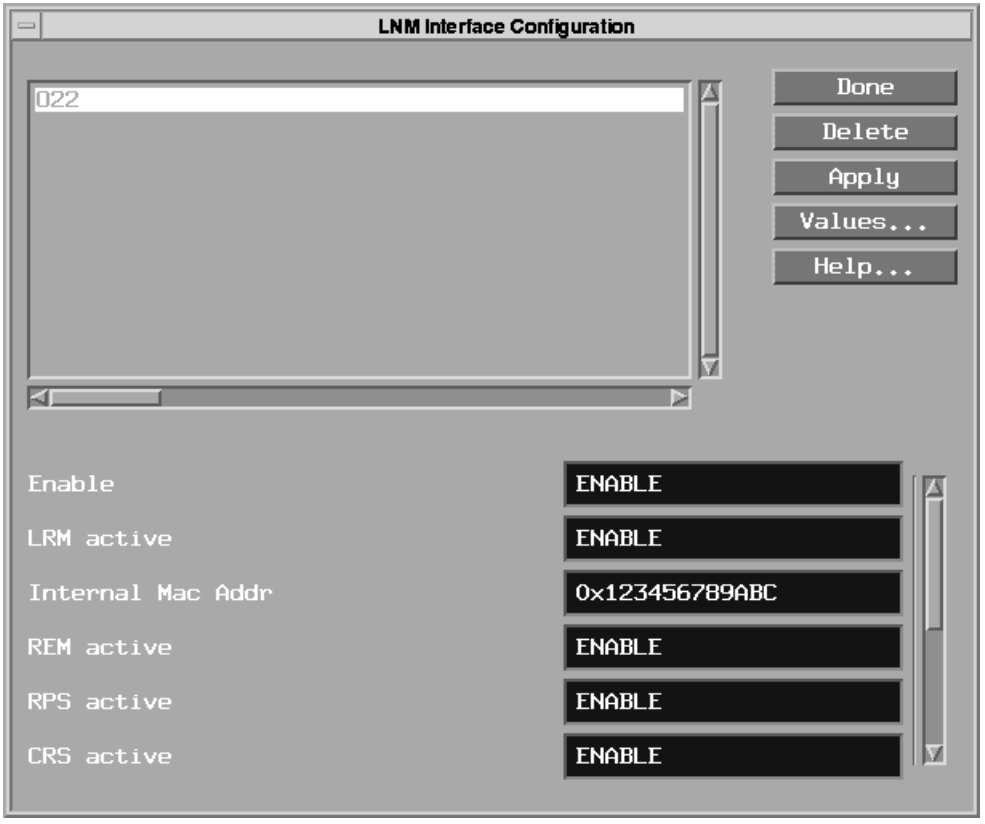


Figure 4-3. LNM Interface Configuration Window

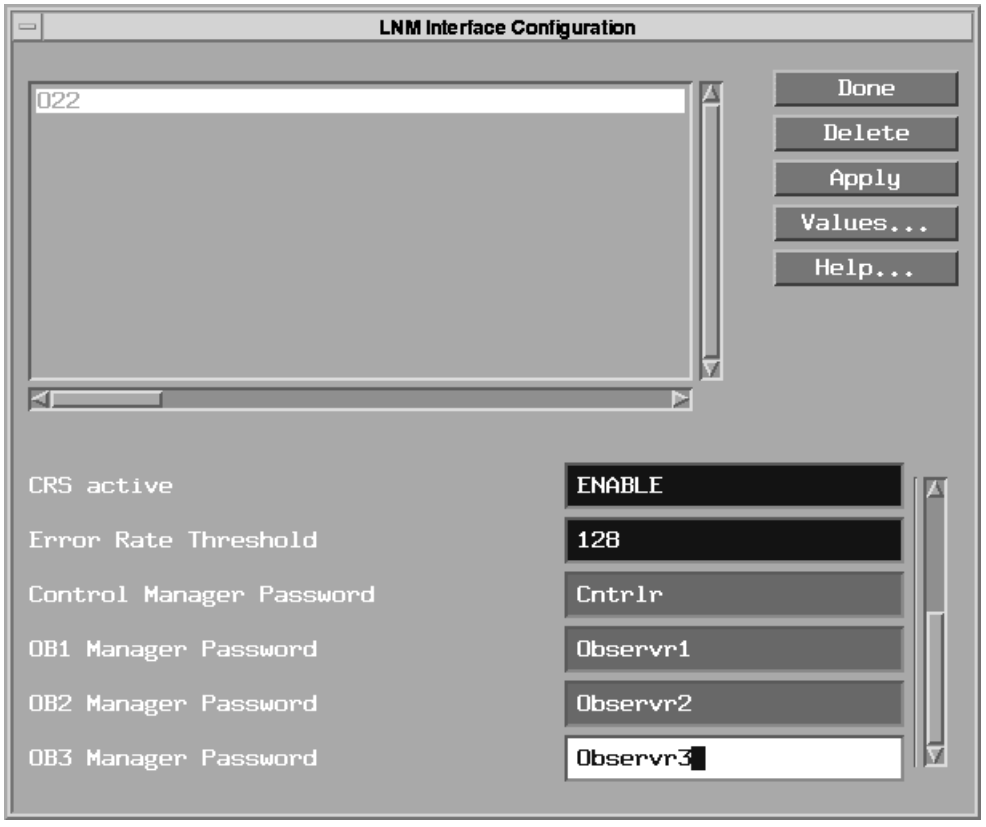


Figure 4-4. LNM Interface Configuration Window (Scrolled)

2. **Select/highlight the interface you want to modify. The parameters associated with that interface appear in the parameter value windows.**
3. **Modify the values of those parameters you wish to change.**

   Use the discussions that follow as a guide.
4. **Click on Apply to save your changes.**
5. **Click on Done to exit the LNM Interface Configuration window.**

Parameter: **Enable**

Default: Enable (the Configuration Manager automatically sets this parameter to Enable for any LNM Servers you add to the node)

Options: Enable | Disable

Function: Enables or disables the LNM Servers on this interface.

Enable -- Initializes the LNM Servers you added to a physical circuit. Use the Enable setting to reinitialize an existing LNM Server disabled earlier. The actual operating state of an interface, once enabled, further depends on

- The current state of the associated circuit
- The current state of the LNM Servers slot-wide protocol process

Disable -- Forces LNM Servers on this slot into the “down” (inoperative) state.

Instructions: Select Enable if you previously set this parameter to Disable and now wish to reenable LNM Server operation on the associated physical circuit.

Select Disable only if you wish to disable LNM Server operation on the associated circuit. Setting this parameter to Disable does not interfere with the ability of the IBM LAN Network Manager application to communicate with other management servers in the same source routing network.

MIB Object ID: 1.3.6.1.4.1.18.3.5.12.2.1.2

Parameter: **LRM active**

Default: Enable

Options: Enable | Disable

Function: Use this parameter to turn the LAN Reporting Mechanism on or off.

Instructions: Select Disable to turn LRM off. Turning off this LRM server breaks off the local reporting links to the Controlling and Observing IBM LAN Network Manager applications. This action has no effect on the reporting links associated with other rings in the same source routing network.

Select Enable to turn LRM on.

MIB Object ID: 1.3.6.1.4.1.18.3.5.12.2.1.6

Parameter:	**Internal MAC Addr**
Default:	None
Options:	Any valid, unique, 48-bit MAC address in MSB (token ring) format
Function:	Specifies a MAC address on the Internal LAN for source routing bridges configured on this router. The IBM LAN Network Manager application uses this destination address for communication with the LNM Servers enabled on this circuit.
Instructions:	Enter in hexadecimal notation a unique, 48-bit MAC address in MSB (token ring) format. For example, enter **0x** followed by 12 hexadecimal digits.
MIB Object ID:	1.3.6.1.4.1.18.3.5.12.2.1.5

Parameter:	**REM active**
Default:	Enable
Options:	Enable | Disable
Function:	Turns the Ring Error Monitor on or off. Turning REM off curtails any further collection of error information from stations on the local ring. The system purges any data collected by REM up to the moment you disable it. Turning REM on resumes the collection of error information from stations on the local ring.
Instructions:	Select Disable to turn REM off. Select Enable to turn REM on, if previously disabled.
MIB Object ID:	1.3.6.1.4.1.18.3.5.12.2.1.9

Parameter:	**RPS active**
Default:	Enable
Options:	Enable | Disable
Function:	Use this parameter to turn the Ring Parameter Server (RPS) on or off. Turning RPS off prevents RPS from automatically providing parameter information to new stations attaching to the local ring. Turning RPS on restores its operation on the local ring.
Instructions:	Select Disable to turn RPS off. Select Enable to turn RPS on, if previously disabled.
MIB Object ID:	1.3.6.1.4.1.18.3.5.12.2.1.11

Parameter:	**CRS active**
Default:	Enable
Options:	Enable | Disable
Function:	Turns the Configuration Report Server (CRS) on or off. Turning CRS off curtails the maintenance of information about the configuration of its local ring. With CRS off, the IBM LAN Network Manager application cannot remove stations from the ring associated with that CRS. Turning CRS on restores its operation on the local ring.
Instructions:	Select Disable to turn CRS off. Select Enable to turn CRS on, if previously disabled.
MIB Object ID:	1.3.6.1.4.1.18.3.5.12.2.1.13

Parameter: **Error Rate Threshold**

Default: 128

Range: 10 to 256

Function: Specifies when an *excessive-soft-error threshold* condition exists on the local ring. An exceeded threshold indicates that

- At least one significant problem exists on the local ring
- Ring performance is eroding as a result of this problem

Exceeding the threshold causes REM to notify the IBM LAN Network Manager of the error/ring-performance condition. The notification appears as a Weight Threshold event you can view and interpret through the Events Manager.

Instructions: After you determine the typical (noncritical or tolerable) error characteristics of a ring, you can set an Error Rate Threshold that provides adequate warning of legitimate (performance-degrading) problems on that ring. Until you make this determination, you can use the default error threshold setting provided by the LNM Servers software.

MIB Object ID: 1.3.6.1.4.1.18.3.5.12.2.1.23

Parameter: **Control Manager Password**

Default: None

Options: Any valid password, consisting of up to eight ASCII characters

Function: Use this parameter to specify a password that allows the Controlling IBM LAN Network Manager workstation access to the LNM Servers for the locally attached ring.

Instructions: Enter any valid, unique password.

MIB Object ID: 1.3.6.1.4.1.18.3.5.12.2.1.15

Parameter:	**OB1 Manager Password**
Default:	None
Options:	Any valid password, consisting of up to eight ASCII characters
Function:	Use this parameter to specify a password that allows Observing IBM LAN Network Manager workstation number 1 to have noncontrolling access to the LNM Servers for a given ring.
Instructions:	Enter any valid, unique password, consisting of up to eight ASCII characters.
MIB Object ID:	1.3.6.1.4.1.18.3.5.12.2.1.16

Parameter:	**OB2 Manager Password**
Default:	None
Options:	Any valid password, consisting of up to eight ASCII characters
Function:	Use this parameter to specify a password that allows Observing IBM LAN Network Manager workstation number 2 to have noncontrolling access to the LNM Servers for a given ring.
Instructions:	Enter any valid, unique password, consisting of up to eight ASCII characters.
MIB Object ID:	1.3.6.1.4.1.18.3.5.12.2.1.17

Parameter:	**OB3 Manager Password**
Default:	None
Options:	Any valid password, consisting of up to eight ASCII characters
Function:	Use this parameter to specify a password that allows Observing IBM LAN Network Manager workstation number 3 to have noncontrolling access to the LNM Servers for a given ring.
Instructions:	Enter any valid, unique password, consisting of up to eight ASCII characters.
MIB Object ID:	1.3.6.1.4.1.18.3.5.12.2.1.18

Deleting LNM Servers from a Circuit

To delete LNM Servers from their associated physical circuit:

1. **From the LNM Interface Configuration window (Figure 4-3), select the LNM Server interface you wish to delete from the node configuration.**
2. **Click on Delete.**

The system software deletes the LNM Servers entry you selected. The entry disappears from the list of LNM Servers in the LNM Interface Configuration window.

Deleting LNM Servers from the Bay Networks Node

To delete all LNM Servers from a Bay Networks node, begin at the Configuration Manager window (Figure 4-1) and complete the following steps:

1. **Select Protocols > LNM Servers > Delete LNM Servers.**

   A confirmation window appears.

2. **Click on OK.**

   The Configuration Manager window appears.

The Bay Networks LNM Servers for the IBM LAN Network Manager are no longer configured on the node.

Appendix A
Site Manager Default Settings

Tables A-1 and A-2 list the Site Manager default parameter settings for the LAN Network Manager (LNM) application. Use the Configuration Manager to edit these default settings.

Table A-1. LNM Global Parameters

Parameter	Default
LAN Net Manager Servers	Enable
IBM LNM “SET” privilege	Disable

Table A-2. LNM Servers Interface Parameters

Parameter	Default
Enable	Enable
LRM active	Enable
Internal MAC Addr	None
REM active	Enable
RPS active	Enable
CRS active	Enable
Error Rate Threshold	128
Control Manager Password	None
OB1 Manager Password	None
OB2 Manager Password	None
OB3 Manager Password	None

Index

A

access passwords, 1-9, 2-6

accessing LNM server parameters, 4-2

acronyms, xv

addresses
- external MAC, 2-4 to 2-5
- internal MAC, 2-4

B

beacon frames, 1-11

bridge link function (IBM LAN Network Manager), 1-10

bridge performance monitoring function (LBS), 1-17

C

communication function (CRS), 1-16

Configuration Manager
- accessing LNM server parameters, 4-2
- deleting server from circuit, 4-12
- deleting servers from node, 4-12
- editing LNM servers global parameters, 4-3 to 4-4
- editing LNM servers interface parameters, 4-5 to 4-11
- window, 4-2

Configuration Report Server (CRS)
- active parameter, 4-9
- communication function, 1-16
- notification function, 1-16
- overview, 1-15 to 1-16
- remove station function, 1-16
- set station parameters function, 1-16
- station status request function, 1-15

configuring LNM servers
- accessing parameters, 4-2
- editing
  - global parameters, 4-3 to 4-4
  - interface parameters, 4-5 to 4-11
- IBM LAN Network Manager requirements, 2-2 to 2-5
- initial configuration, 2-1 to 2-5

control function (LRM), 1-7

control manager password parameter, 4-10

conventions, text, xiv

D

defaults, LNM parameters, A-1

deleting LNM servers
- from a circuit, 4-12
- from the node (globally), 4-12

E

editing LNM server parameters
- accessing parameters, 4-2
- deleting server from circuit, 4-12
- deleting servers from node, 4-12
- global, 4-3 to 4-4
- interface, 4-5 to 4-11
- overview, 4-1

educational services, xvii

enable (global) parameter, 4-4

enable (interface) parameter, 4-7

error rate threshold parameter, 4-10

external MAC address, 2-4 to 2-5

F

functional addresses
- Configuration Report Server (CRS), 1-4
- Ring Error Monitor (REM), 1-4
- Ring Parameter Server (RPS), 1-4

functions
- communication (CRS), 1-16
- control (LRM), 1-7
- hard error processing (REM), 1-11
- intensive mode reporting (REM), 1-13
- notification (CRS), 1-16
- notification (LBS), 1-17
- notification (LRM), 1-8
- passwords (LRM), 1-9
- protocol boundary (LRM), 1-9
- receiver-congestion error reporting (REM), 1-13
- registration (RPS), 1-14
- remove station (CRS), 1-16
- reporting link maintenance (LRM), 1-6
- ring station parameters maintenance (RPS), 1-14
- routing (LRM), 1-8
- RPS activation, 1-15
- security (LRM), 1-9
- set parameters
  - CRS, 1-16
  - LBS, 1-17
  - REM, 1-13
- soft-error processing
  - isolating (REM), 1-12
  - non-isolating (REM), 1-12
- soft-error reporting (REM), 1-12
- status request
  - CRS, 1-15
  - LBS, 1-17
  - REM, 1-13
  - RPS, 1-14

H

hard-error processing function, 1-11

I

IBM LAN Network Manager
- alternate, 1-8
- application program, 1-1
- bridge link function, 1-10
- capabilities, 1-2
- communicating with NetView, 1-2
- configuring LNM servers, 2-2 to 2-6
- controlling manager, 1-7, 1-8
- levels of management services, 1-2
- local services, 1-3
- network administrator capabilities, 1-2
- network-wide services, 1-3
- number of RPS servers per ring, 2-6
- observing, 1-8
- operating restrictions, 1-1
- overview, 1-1 to 1-3
- redundant servers on a ring, 2-6
- reporting links, 1-6, 1-8
- requirements, 2-2 to 2-5
- setting Bay Networks LNM parameters, 2-5

IBM LNM set privilege parameter, 4-4

implementation notes, 2-1 to 2-6

initial configuration, 2-1 to 2-5

intensive mode reporting function (REM), 1-13

internal MAC address parameter, 4-8

isolating soft-error processing (REM), 1-12

L

LAN Bridge Server (LBS)
- bridge performance monitoring function, 1-17
- notification function, 1-17
- overview, 1-16
- set parameters function, 1-17
- status request function, 1-17

LAN management servers
- additional information, 1-18
- addressing, 1-4
- Configuration Report Server (CRS), 1-3, 1-15 to 1-16
- LAN Bridge Server (LBS), 1-16 to 1-17
- LAN Reporting Mechanism (LRM), 1-6 to 1-10
- Ring Error Monitor (REM), 1-11 to 1-13
- Ring Parameter Server (RPS), 1-14 to 1-15

LAN Reporting Mechanism (LRM)
- control function, 1-7
- LLC requirements, 1-9 to 1-10
- notification function, 1-8
- overview, 1-6 to 1-10

password functionality, 1-7, 1-9
protocol boundary function, 1-9
reporting link maintenance function, 1-6
routing function, 1-8
security function, 1-9
link bridge function (IBM LAN Network Manager), 1-10
LLC requirements, 1-9 to 1-10
LNM defaults, A-1
LNM servers
accessing parameters, 4-2
deleting from circuit, 4-12
deleting from node, 4-12
editing
global parameters, 4-3 to 4-4
interface parameters, 4-5 to 4-11
implementation notes, 2-1 to 2-6
overview, 1-1, 1-3 to 1-17, 4-1
LNM servers enable (global) parameter, 4-4
local services (IBM LAN Network Manager), 1-3

M

MAC address select parameter, 2-4 to 2-5
MAC-layer addresses (LNM servers), 1-4
MAC-layer servers
Configuration Report Server (CRS), 1-4
Ring Error Monitor (REM), 1-4
Ring Parameter Server (RPS), 1-4
Management Servers, 1-3

N

NetView, 1-2
network-wide services (IBM LAN Network Manager), 1-3
non-isolating soft-error processing function (REM), 1-12
notification
(CRS), 1-16
(LBS), 1-17
(LRM), 1-8
number of RPS servers per ring, 2-6

O

OB1 manager password parameter, 4-11
OB2 manager password parameter, 4-11
OB3 manager password parameter, 4-11
operating restrictions (IBM LAN Network Manager), 1-1
overview of LNM servers, 1-1 to 1-17

P

parameters
circuit/line
MAC address override, 2-5
MAC address select, 2-4 to 2-5
global
IBM LNM set privilege, 4-4
LNM servers enable, 4-4
interface
control manager password, 4-10
CRS active, 4-9
enable, 4-7
error rate threshold, 4-10
internal MAC address, 4-8
LRM active, 4-7
OB1 manager password, 4-11
OB2 manager password, 4-11
OB3 manager password, 4-11
REM active, 4-8
RPS active, 4-9
passwords
checking, 1-9
controlling manager, 4-10
functionality, 1-7, 2-6
observing manager 1, 4-11
observing manager 2, 4-11
observing manager 3, 4-11
product support, xvii
protocol boundary function (LRM), 1-9
publications, Bay Networks, xvi

R

receiver-congestion error reporting function (REM), 1-13

redundant servers on a ring, 2-6

reference materials, 1-18

registration function (RPS), 1-14

remove station function (CRS), 1-16

reporting link maintenance function (LRM), 1-6

reporting links, 1-16

Ring Error Monitor (REM)
- hard error processing function, 1-11
- intensive mode reporting function, 1-13
- isolating soft-error processing, 1-12
- non-isolating soft-error processing function, 1-12
- overview, 1-11 to 1-13
- receiver-congestion error reporting function, 1-13
- set parameters function, 1-13
- soft-error
  - processing, 1-11
  - reporting, 1-12
- status request function, 1-13

Ring Parameter Server (RPS)
- activation function, 1-15
- overview, 1-14 to 1-15
- registration function, 1-14
- ring station parameters maintenance function, 1-14
- status request function, 1-14

ring station parameters maintenance function (RPS), 1-14

ring-wide services, 1-2

routing function (LRM), 1-8

S

security
- function (LRM), 1-9
- passwords, 2-6, 2-6

server functional addresses, 1-4

servers
- Configuration Report Server (CRS), 1-15
- LAN Bridge Server (LBS), 1-16
- LAN Reporting Mechanism (LRM), 1-6 to 1-10
- LLC requirements, 1-9 to 1-10
- per ring, 2-6
- Ring Error Monitor (REM), 1-11
- Ring Parameter Server (RPS), 1-14

set parameters function
- CRS, 1-16
- LBS, 1-17
- REM, 1-13
- setting Bay Networks parameters, 2-5

soft-error processing
- error types, 1-12
- isolating (REM), 1-12
- non-isolating (REM), 1-12
- weight parameter, 1-12

soft-error reporting function (REM), 1-12

status request function
- CRS, 1-15
- LBS, 1-17
- REM, 1-13
- RPS, 1-14

support, Bay Networks, xvii

T

technical publications, xvi

technical support, xvii

text conventions, xiv

W

weight parameter, 1-12, 4-10

weight threshold, 4-10